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Note on labour productivity estimates

The Australian Energy Regulator (AER) commissioned Deloitte Access Economics to provide a report on the wage price growth forecasts for the utilities industry for New South Wales, Tasmania, the Northern Territory and the Australian Capital Territory (Report 1). This report was delivered in July 2018.

Report 1 included estimates of labour productivity and this note provides further detail on the methodology adopted to develop those estimates.

1.1 Methodology description

Labour productivity measures the number of units of output an individual employee can produce in a given time period. The more units of output each worker can produce, the fewer workers are required to create a given level of output.

Report 1 included estimates of labour productivity for both the total economy ('All industries') and for the utilities industry. These forecasts were provided for Australia and for various states and territories. This creates four levels of labour productivity estimates. An example is shown in Table 3.2 of our report (reproduced below) which gave specific projections for New South Wales.

Table 3.2: New South Wales and national labour productivity forecasts

Financial year changes in New South Wales and national labour productivity forecasts

	History	Forecast						
Annual % change	**2016-17**	**2017-18**	**2018-19**	**2019-20**	**2020-21**	**2021-22**	**2022-23**	**2023-24**
New South Wales - All industries	2.1	-0.2	1.4	1.5	1.1	1.1	1.0	0.9
New South Wales - Utilities	1.6	-0.6	1.4	1.6	1.4	1.4	1.3	1.1
National - All industries	0.8	-0.4	1.6	1.7	1.6	1.5	1.3	1.2
National - Utilities	1.1	-0.7	1.5	1.7	1.6	1.6	1.4	1.2

Source: Australian Bureau of Statistics, Deloitte Access Economics

The table shows estimates of annual growth rates for labour productivity based on annual measures for output and employment.

The method used to estimate labour productivity differs across the four different levels, but there are three different values that are utilised to create these measures:

1. 'National' productivity = Gross Domestic Product / employed persons in Australia
2. 'State' productivity = Gross State Product / employed persons in that State
3. 'Industry' productivity = Gross Value Added / employed persons in that industry in Australia

For these measures, historical estimates use actual Australian Bureau of Statistics (ABS) data and forecasts are taken from the most recent edition of Deloitte Access Economics' *Business Outlook* publication. These measures are combined as follows to give the four measures shown in Table 3.2.

National – All industries labour productivity is calculated as:

Productivity = 'National'

New South Wales – All industries labour productivity is calculated as:

Productivity = 'State'

National – Utilities labour productivity is calculated as:

Productivity = ('National' + k x 'Industry') / (1 + k)

New South Wales – Utilities labour productivity is calculated as:

Productivity = ('National' + p x 'State' + k x 'Industry') / (1 + p + k)

where p and k denote the relative weights between 0 and 1.

Productivity measures for all states and industries are estimated using the same method as outlined above.

This method is adopted for the following reasons:

- This method relies on ABS data that are available on a quarterly basis. This is not the case for industry-specific output at the state level, which is only available on an annual basis.
    - There is an exception in the case of Gross State Product (GSP), with quarterly estimates of only State Final Demand (SFD) available. However, Deloitte Access Economics creates quarterly GSP estimates based on available SFD data, other published information on international trade and our own estimates of the remaining components of GSP.
- The method minimises the volatility in the underlying data by creating a composite productivity measure based on national, industry and (where appropriate) state-specific productivity movements.
    - The weights adopted reflect the volatility observed in the data, which is usually reflective of the size of the state or industry in question. Larger states have a larger value of 'p' in the equation above. Similarly, larger industries have a larger value of 'k', but other factors are also considered.
- The national measure is considered important given that trends in national labour productivity will be seen in industry-specific results. Forecasting productivity at the national level can also be more informative and reliable given volatility in industry level information. The national measure removes the 'noise' in industry-specific results giving a more meaningful estimate of overall movements.
- In the case of some industries the change in the simple measure of labour productivity may be driven by changes in the composition of the industry itself, rather than changes in underlying productivity. Within utilities there are significant differences in the labour productivity measures from the electricity, gas and waste components.
    - The composite measure adopted minimises this risk by giving a larger weighting to the national measure and a smaller weighting for 'k'.

The employment measures for labour productivity used in the report are not adjusted for quality since they do not take into account the quality of the workforce based on experience and skills. Nor do these measures adjust for hours worked, either by distinguishing between full-time and part time employment, or by using an explicit hours worked measure of employment.

An outline for the methodology used to create forecasts of output and employment is included in the appendix of Report 1.

1.2 Key data sources

Output measures are taken from ABS Catalogue 5206.0 - *Australian National Accounts: National Income, Expenditure and Product*. National GDP can be found in Table 1 of that publication, GSP estimates are derived mainly from data in Table 25. National industry output measures are found in Table 6.

Total employment measures are largely derived from ABS Catalogue 6202.0 - *Labour Force, Australia*. National levels are found in Table 1 and state/territory levels in Tables 4 to 11.

Industry specific employment levels are found in ABS Catalogue 6291.0.55.003 - *Labour Force, Australia, Detailed, Quarterly*. All results can be found in Table 5.

Raw data may be adjusted to ensure they are consistent with seasonally adjusted state and national totals.

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